Section 9: Remedial Action Plans and Watershed Implementation

9.1 Introduction

In addition to the development of LaMPs, Annex 2 of the Great Lakes Water Quality Agreement called for the development of Remedial Action Plans (RAPs) for the most environmentally degraded Areas of Concern (AOCs) around the Great Lakes. There are 12 AOC in the Lake Erie basin: two binational, one Canadian and nine U.S. The RAPs have a smaller geographic focus than the LaMP, often encompassing only part of a watershed, and focus on restoring locally impaired beneficial uses. Implementation of remedial actions has been underway in most RAPs for over twelve years, using a combination of federal, state, provincial and local resources. The restoration of the AOCs will help to improve Lake Erie, and actions to restore Lake Erie will often benefit the AOCs. It is essential for the Lake Erie LaMP to continue to cultivate communication with the RAPs and to benefit from the successful partnerships and programs that the RAPs have already created. In many ways the success of the LaMP depends on the success of the RAPs.

Source track-down conducted for the LaMP identified the AOCs, as well as certain other watersheds,as key source areas and also where remediation could most benefit the lake. Land use management practices in particular have a significant impact on tributary loading to the lake. Therefore, the LaMP will focus on implementing management actions in the AOCs and at the watershed level as the primary steps towards restoring beneficial uses to the lake.

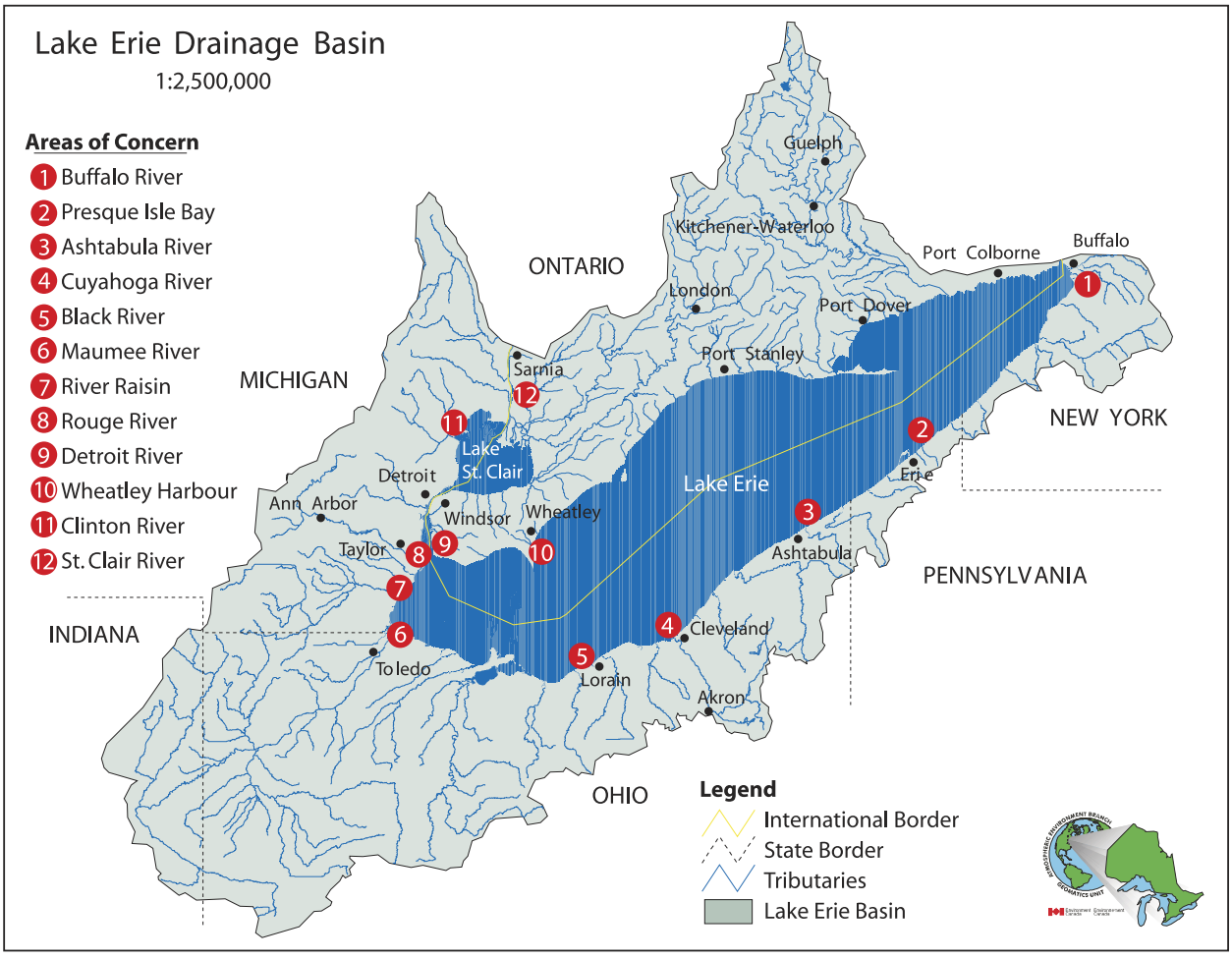

Figure 9.1: Areas of Concern in the Lake Erie drainage basin

The watershed is widely regarded as an appropriate unit to manage natural resources. As part of the Lake Erie LaMP process, the Fuzzy Logic model developed by and for the Lake Erie LaMP identified land use as the single biggest driver of in-lake conditions (Colavecchia et al. 2000). Watershed management focuses on land use and the sources of contaminants that are associated with land based activities. On a broader scale, Justice O'Connor's reports stemming from the Walkerton, Ontario tragedy reaffirmed the importance of watershed management. He focused many of his recommendations on mechanisms to strengthen and institutionalize watershed management through Source Water Protection Plans for drinking water in Ontario as a means to protect human health and the environment.

There are many watershed based projects underway around the Lake Erie basin, however, as with the RAPs, most of them are designed to address problems in that watershed and do not address potential impacts to Lake Erie. As the Lake Erie LaMP progresses, the LaMP partners will continue to assess these existing watershed projects encouraging better connections between the watersheds and the overall state of the lake. Watershed action plans and Total Maximum Daily Load plans (TMDLs) underway in the U.S. will be important to follow and coordinate with. In Ontario, the Conservation Authorities' initiatives in support of watershed-based source water protection in the Lake Erie basin will provide critical information that can be used to address the stresses imposed on the lake by adverse conditions in key tributaries.

The following sections highlight the major activities completed or underway in the Lake Erie AOCs and several selected watersheds. Note that these activities are only a small representation of the ongoing watershed work throughout the basin. For the most part, these updates cover only those actions implemented or initiated since the Lake Erie LaMP 2004 Report was published. Table 9.1 provides a "snapshot" of the AOC and watershed programs. In the future, this section will continue to expand the presentation of accomplishments in other watersheds as they become more focused on implementation of management efforts to assist in achieving the goals of the Lake Erie LaMP.

9.2 Remedial Action Plan Updates

Buffalo River RAP, New York
www.fbnr.org
www.epa.gov/glnpo/aoc/buffalo.html

History

The Buffalo River RAP process was originally developed as a partnership among U.S.EPA, the New York State Department of Environmental Conservation (NYSDEC) and the Buffalo River Citizens' Committee. The committee was established by NYSDEC in 1987 and is made up of representatives from community, environmental, academic, sporting, and local government interests. The AOC includes the lower 6.2 miles of the river (10km). The combined Stage 1 and Stage 2 RAP was completed in November 1989 as a working document. RAP status reports have been published since 1991 to update commitments, track implementation, and celebrate accomplishments.

Remedial activity efforts have been focused on six major areas: stream water quality monitoring; river bottom sediments; inactive hazardous waste sites; municipal and industrial wastewater treatment facilities; combined sewer overflows; and fish and wildlife habitat. Strategies and remedial activity progress are updated annually in the Buffalo River RAP Status Report produced by the Buffalo Niagara Riverkeepers. There are five BUIs in the AOC: fish and wildlife consumption advisories; the presence of fish tumors; degraded benthos; dredging restrictions; and loss of fish and wildlife habitat.

Progress since 2004 LaMP Report

The Buffalo Niagara Riverkeepers (BNR), formerly the Friends of the Buffalo Niagara Rivers, have received U.S.EPA-GLNPO funding to continue RAP coordination. The focus is on research, priority project implementation, and restoring the beneficial uses through delisting considerations. The RAP process assesses project costs for implementation. The BNR is conducting RAP reporting and project management including: the Buffalo River

Sediment Remediation Feasibility Study; the City of Buffalo's waterfront revitalization; and the Buffalo Sewer Authority's CSO correction. The Buffalo Sewer Authority's draft LTCP for CSO abatement is currently under review by NYSDEC and will be included in the city's SPDES permit once the LTCP is approved.

Other projects address data gaps and needs to reduce nonpoint sources, restore habitat, and improve the watershed's open space areas. Three habitat improvement projects have been constructed to address habitat impairments with funding provided through U.S.EPA. Coordination involved Erie County, the City of Buffalo, USFWS, USACE, and NYSDEC. A Sediment Remediation Feasibility Study is underway by the USACE, U.S.EPA, NYSDEC and the BNR to characterize the extent and spatial distribution of priority contaminants within river sediments between the inner harbor upstream to the confluence of Buffalo Creek and Cazenovia Creek.

In addition, a Report Card has been developed that clearly defines environmental categories (e.g. water quality, land use), successes and improvements, current conditions, steps for resolution, and applies a grade and trend rating the current status. The 2005 Buffalo River RAP Status Report is posted on the BNR website.

Next Steps

- Under the leadership of the BNR, the revitalized Remedial Action Committee (RAC) has federal funding to continue RAP implementation. An organizational structure involving an executive committee with four working groups is leading the RAP to address: 1) project implementation – beneficial use assessment and evaluation; 2) RAP reporting; 3) remedial strategies and monitoring; and 4) public outreach and involvement.
- Delisting criteria are under further development. Beneficial Use Assessment (BUA) studies are planned or already underway for several indicators. The BUA workgroup notes conducting successful planning meetings and development of a contract to conduct a herpetological study in 2006. An algae and phytoplankton study is planned, and a staff biologist is to be hired to assist in habitat assessment.
- A volunteer River Watcher program is underway to report observations to the BNR. The watchers are to assist in evaluating the visibility of the Buffalo River and formation of a Remedial Strategy Workgroup for the AOC.
- The Valley Community Association has received a loan to address riverfront property restoration.
- The City of Buffalo, BNR and Buffalo River Planning are to submit a grant application to the New York State Department of State Brownfield Opportunity Area program for restoration of 500 acres in the Buffalo River corridor. The City has already received funding for an area south of the river to Lackawanna.
- The City of Buffalo's Good Neighbor Planning Alliance has requested BNR to assist in the development of a plan related to brownfields and waterfront issues.
- The Buffalo River Greenway Implementation Plan will be completed soon. Separate partnership efforts with the Land Conservancy and Trust for Public Land are working on land acquisitions and easements to address waterfront parcels.
- Continue developing the Sediment Remediation Feasibility Study and identify alternative sources of funding for remediation.
- NYSDEC stocked several thousand walleye into the Buffalo River in 2005 and will continue to evaluate the potential for long-term restoration of the valuable sport fishery.
- Negotiations continue with the Buffalo Sewer Authority and upstream municipalities to address CSO/SSO abatement and elimination plans.
- The Erie County Soil & Water Conservation District is working with municipalities and private landowners on riparian buffer activities to reduce soil erosion and nutrient loading from upper watershed areas. SUNY Buffalo and SUNY College at Buffalo are collaborating on finalizing a sediment transport model for the watershed.

Presque Isle Bay RAP, Pennsylvania
www.epa.gov/glnpo/aoc/presque.html

History

Located in the northwest corner of Pennsylvania on the southern shore of Lake Erie, Presque Isle Bay is a 3718 acre (1505 hectare) natural embayment formed by a 7 mile long (11.3 km) re-curved sand spit. Over 80% of the bay's watershed is comprised of urban and industrial land uses in the City of Erie and its outlying townships. As a relatively closed system with a hydrologic detention time of almost 2.5 years, Presque Isle Bay tends to act as a natural "settling basin" for sediment entering its waters. Given the urban nature of the majority of the watershed, much of this sediment is contaminated with heavy metals and various organic compounds. Presque Isle Bay was designated as the 43rd Great Lakes Area of Concern by the US Department of State in 1991. The Pennsylvania Department of Environmental Protection (PADEP) examined over 3100 brown bullhead catfish from the bay. Histopathology confirmed an external tumor rate of 64% and a liver tumor rate of 22%. A Stage 1 Report submitted to the IJC in 1993 listed the BUIs of fish tumors or other deformities and restrictions on dredging.

A sediment study completed by Battelle Ocean Sciences in 1997 suggested that the implementation of source control measures in the watershed may be sufficient to allow for natural recovery of bay sediments. Gannon University provided results of a sediment investigation conducted jointly with U.S.EPA in 2000. The study utilized a "triad" sampling approach entailing sediment chemical sampling for metals and PAHs, benthic macroinvertebrate assemblage analysis, and sediment toxicity testing. Sediment dioxin/furan levels were also analyzed at the request of the PAC. Metals and PAH results generally supported earlier Battelle findings of widespread, low-level contamination without identifiable hot spots. Due to lack of screening criteria in Pennsylvania, dioxin/furan results were compared to New York state sediment screening criteria. Concentrations of these compounds were below human health screening levels but exceeded wildlife screening criteria. Based on these preliminary findings, PADEP analyzed fish tissue from six resident bay species in 1991 and found the dioxin/furan tissue burden to be well below advisory levels.

Since 1989, the City of Erie has spent over $100 million to upgrade its sewage system. Many CSOs that contributed up to 50 million gallons per day of untreated sewage to the bay were eliminated. In 1991, a large coal-fired power plant (a source of metals and PAHs) along the bayfront was decommissioned and converted to a library and museum. The rest of Erie's bayfront was undergoing a dramatic transformation from a highly industrialized corridor to a recreational, residential and light commercial zone. Perhaps not surprisingly, these changes corresponded to dramatic improvements in the health of the Bay's brown bullhead population. Longitudinal monitoring of these bottom-feeding fish has shown that between 1992 and 1999, the frequency of external tumors has declined from 64% to 17%, and the frequency of liver tumors has declined from 22% to 0%.

In December, 2002, Presque Isle Bay became the first U.S. AOC to attain the "AOC in Recovery Stage" designation. In addition to celebrating the hard work and environmental ethic of the Erie community, this milestone marked a shift in PADEP's focus from assessment and remedial action to monitoring, pollution prevention, and the development of delisting targets for the Bay's BUIs.

Progress since 2004 LaMP Report

Brown bullhead monitoring has continued annually in Presque Isle Bay. Bullhead are collected and examined for grossly observable external lesions, and a subsample of fish is necropsied for histopathological analysis. Tissue samples are sent to the USGS Leetown (WV) Laboratory for histological analysis of external and liver lesions. Preliminary monitoring results to date suggest that bullhead lesion rates have remained stable during the Recovery Stage period. Data are currently undergoing statistical analysis.

PADEP initiated a study in 2004 to determine the background (reference) incidence rate of brown bullhead lesions in Lake Erie. Samples were collected from non-AOC reference sites in New York, Pennsylvania and Ohio and evaluated in accordance with the methodology

developed for Presque Isle Bay. These same locations were re-sampled in 2005. Final results are expected in early 2006. The results of this work will be used to support the development of appropriate delisting targets for the Fish Tumors or Other Deformities BUI.

Pennsylvania Sea Grant has funded several lines of research to better understand the environmental biology and ethology of the Bay's brown bullhead population. This ongoing research includes: 1) A study by Gannon University to sample the deeper, open waters of the Bay to better understand seasonal brown bullhead migration patterns and the dynamics of bullhead exposure to contaminated sediment; 2) A study of the reproductive success of brown bullhead in Presque Isle Bay by sampling young-of-year bullhead and tracking recruitment into the population; and 3) Genetic research to determine the extent to which the Bay's *Ameiurus* species hybridize and the potential relationship between bullhead genetics and the elevated tumor incidence rate in this fish population.

With funding from U.S.EPA-GLNPO, the PADEP and Pennsylvania Sea Grant have held a series of workshops to: 1) evaluate the historical sediment contamination in the Bay; 2) develop a comprehensive sediment sampling program to augment historical data; and 3) develop appropriate delisting targets for the Restrictions on Dredging BUI. Experts from U.S.EPA, USGS, NOAA and several state agencies have participated at these workshops along with the Bay's PAC sediment subcommittee. Final delisting targets will be proposed by PADEP following the review and analysis of the comprehensive sediment sampling results by the experts.

In September 2005, PADEP partnered with PA Sea Grant, Gannon University, the Erie County Department of Health, the Regional Science Consortium at the Tom Ridge Center at Presque Isle Bay, and MacDonald Environmental Services, Ltd. to implement the comprehensive sediment sampling program developed during the sediment BUI workshops mentioned above. More than 50 surficial and sediment core samples were collected from Presque Isle Bay to characterize both the current and historical levels of sediment contamination. The U.S.EPA research vessel, The Mudpuppy, assisted with the collection of sediment cores. Both chemical and toxicological analyses are being conducted. The results of the study are expected in early 2006.

PADEP's Coastal Resources Management Program funded a 2005 study by the Erie County Department of Health to sample suspended sediment quality in major tributaries to Presque Isle Bay. Results are expected in 2006.

Next Steps

- The final Fish Tumor and Other Deformities BUI workshop is planned for February 2006. Experts from the U.S.EPA, USGS, academia, state agencies, and elsewhere will meet with PADEP and the Bay's PAC fish subcommittee to discuss bullhead monitoring results to date. Important outcomes from this series of workshops will include standardized bullhead sampling, necropsy, and analysis protocols and the development of updated AOC delisting targets for this BUI.
- The final Restrictions on Dredging BUI workshop is planned for 2006. Sediment experts will meet once again with PADEP and the Bay's PAC sediment subcommittee to discuss their analysis of available sediment quality data and make recommendations regarding appropriate delisting targets. Final targets will be proposed by PADEP following the evaluation of the comprehensive sediment sampling results and analysis of data by the experts.
- PADEP, in partnership with Pennsylvania Sea Grant and MacDonald Environmental Services, Ltd. plans to present a series of papers at IAGLR 2006 regarding the development and application of delisting criteria for Great Lakes AOCs based on the work done in Presque Isle Bay.
- PADEP has partnered with Pennsylvania Sea Grant to seek funding to develop a comprehensive management plan for the Bay watershed and develop an on-line library of literature related to the AOC.
- PADEP plans to host a summit of Lake Erie RAP, watershed and LaMP groups in 2006.

Ashtabula River RAP, Ohio
www.epa.gov/glnpo/aoc/ashtabula.html

History

The Ashtabula River is located in far northeastern Ohio. Years of unregulated discharge and mismanagement of wastes along the river and Fields Brook (a superfund site) seriously contaminated sediments and degraded biological communities. The lower two miles of the river encompass the AOC. The Ashtabula River RAP process began in 1988 with the establishment of the Ashtabula River RAP Advisory Council. The 1991 Stage 1 Report documented six beneficial use impairments, all related to contaminated sediment. These included: restrictions on fish and wildlife consumption; degradation of fish and wildlife populations; fish tumors or other deformities; degradation of benthos; restrictions on dredging; and loss of fish and wildlife habitat. PCBs are the major contaminant driving the cleanup, but mercury, PAHs, low level radionuclides and other chlorinated organics are also of concern. An interim dredging project in 1993 removed several feet of relatively uncontaminated sediments to keep the recreational navigation channel open.

The Ashtabula River Partnership (ARP) was created in 1994 to serve as a more formally structured, concentrated effort to get the river dredged. As an alternative to the impending designation of the river as an extension of the Fields Brook superfund site, the ARP's goal was to look beyond traditional approaches to determine a comprehensive solution for remediating contaminated sediments and restoring beneficial uses. An oversight committee and several technical committees were established and a local coordinator was hired. The nonprofit Ashtabula River Foundation was incorporated in 1997 to manage financing for the river cleanup.

Since 1990, extensive sediment characterization studies have been implemented to: map concentrations of pollutants (particularly PCBs); estimate sediment volume to be removed; delineate PAH distribution; ensure sediments did not qualify as hazardous waste; screen for low level radioactive waste; and model sediment transport, scouring and deposition rates. A creative mix of funding from local partners, U.S.EPA, US Army Corps of Engineers (USACE), GLNPO, Ohio EPA and potentially responsible parties funded the above studies and the preparation of a comprehensive management plan and environmental impact study (CMP/EIS). Extensive reviews of all agencies' authorities were conducted to determine critical decision points and whose responsibility they would be.

Progress since 2004 LaMP Report

The Comprehensive Management Plan/EIS for river dredging was approved by the USACE.

A 50 acre upland site was purchased for construction of the landfill facility.

Water quality target criteria to achieve during the dewatering process have been identified and a monitoring plan to ensure environmental protection during the dredging and dewatering has been developed.

The primary federal funding source for river dredging had been expected to be the USACE under WRDA 312 and operation and maintenance (O&M) authorities. However, uncertainties in the federal budget prompted the ARP to apply for newly authorized Great Lakes Legacy Act (GLLA) funding as well. Under this scenario, Legacy Act funds would be used to remediate the more contaminated upstream area, while USACE funds would be used in the downstream portion that currently supports commercial navigation. Approval of $25 million in GLLA funding was announced on December 12, 2005.

Federal and state natural resource trustees began work on a formal Part B assessment on behalf of an Ashtabula River natural resource damage claim under CERCLA authority. Sampling was done for water quality, fish tissue and community and sediment.

Next Steps

- Construction of the landfill will begin in 2006. Dredging will begin as soon as the landfill is ready. Additional coordination will continue with the Corps to dredge the lower, less contaminated area of the river. Once the contaminated sediments

have been removed, monitoring will be needed to determine if the cleanup has been sufficient to restore beneficial uses. Additional habitat restoration may be needed.

- Several habitat restoration projects funded under an NRDA settlement related to the Fields Brook Superfund site are planned for the river.

Cuyahoga River RAP, Ohio

www.cuyahogariverrap.org
www.epa.state.oh.us/dsw/rap/cuyahog.html
www.epa.gov/glnpo/aoc/cuyahoga.html

History

The Cuyahoga River RAP Coordinating Committee, representing multiple sectors, was appointed by the Ohio EPA in 1988. The non-profit Cuyahoga River Community Planning Organization (CRCPO) was formed to receive funds and provide local staff to support RAP activities. The AOC covers the lower 45 miles of the river and 10 miles of shoreline from Edgewater Park to Wildwood Park. The 1992 Stage 1 Report identified 10 beneficial use impairments including: restrictions on fish consumption; degradation of fish populations; fish tumors or other deformities; degradation of benthos; restrictions on dredging activities; eutrophication; beach closings; degradation of aesthetics; and loss of fish and wildlife habitat. Several update reports have been prepared since the 1992 report.

The Cuyahoga was named an American Heritage River (AHR) in 1998. Although the AHR program covers the entire river and the RAP only the lower portion, the two initiatives work together to leverage the resources needed to improve the river. Over the past several years, the RAP has worked to break the AOC down into smaller watershed units and establish individual watershed stewardship groups. There are six groups to date. The RAP is also participating in the TMDL development and implementation in the lower river. The RAP worked with the Ohio EPA to develop and adopt water quality standards for the navigation channel as part of the first step in what became a phased TMDL process for the river. Over the years, the Cuyahoga RAP has hosted workshops and conferences, prepared numerous educational brochures and guides, implemented a number of habitat restoration projects, completed a wetland location and categorization inventory to provide options for mitigation and protection within the AOC, fostered adoption of conservation easements, and worked with several local initiatives to preserve green space and better tie environmental protection with economic development. Field studies have also been done to better characterize fish communities, habitat needs and sediment contaminant quantification, particularly in the navigation channel of the river.

Progress since 2004 LaMP Report

Follow-up studies to the 2003 approved TMDL for the lower river are underway. These include a stressor identification study for Tinker's Creek, and a feasibility study for the removal of the Rt. 82 dam. Following several studies to improve the dissolved oxygen levels and habitat in the navigation channel, the RAP is pursuing options to install fish habitat units along/behind the sheet piling lined riverbanks. The RAP has begun a reassessment of BUIs on a subwatershed basis and as compared to the Ohio Delisting Targets for AOCs.

In 2005 the RAP and partners conducted further assessment of wetlands in the AOC to measure their quality to provide the basis for prioritizing protection and restoration. Several RAP partners also completed a Community Riparian and Wetland Guidance manual providing guidance on the utility of local setback ordinances. These partners also produced a detailed brochure on the advantages of conservation easements, how to establish them and the current organizations holding them for the entire U.S. Lake Erie watershed.

Upstream of the AOC, the Kent Dam was redesigned to improve flow and eliminate stagnant upstream pools as well as create a challenging passage for kayakers and a riparian park. The Munroe Falls dam was also removed uncovering a natural succession of smaller falls. These dam removals as well as others anticipated further downstream are helping to restore the natural hydrology of the Cuyahoga River.

Next Steps

- Both Akron and Cleveland have approved plans for the long term removal of CSOs, but it will be 20 to 30 years before all construction is completed.
- Further improvement in river conditions from sediment and non-point source reductions is expected as Phase II Storm Water Management Plans are implemented by permitted communities within the AOC. These communities are required to adopt local measures to control storm water runoff from construction activities and municipal operations, remove illicit discharges, and institute public education and involvement activities by early 2008.
- The RAP continues to work with various other local initiatives to better connect economic advancements and environmental improvements.
- Additional progress in restoring beneficial uses within the AOC can only continue with the support of local community watershed groups dedicated to providing stewardship of their local tributary streams. The RAP and its partners continue to support groups that have formed in Euclid Creek, Doan Brook, West Creek, Mill Creek and Pond Brook. New watershed groups are in the process of being established in Big Creek, Yellow Creek, Tinkers Creek and Chippewa Creek with the assistance of the RAP and its partners. Many of these groups have or will complete watershed action plans for their tributary streams over the next several years.
- Under WRDA 2006, $500,000 was budgeted for the Corps of Engineers to work with the Cuyahoga RAP and partners to develop and test a "high performance shoreline management system" (green bulkhead) prototype along the Cuyahoga River ship channel. The RAP has been working for many years to re-establish some habitat along the largely bulkheaded ship channel.

Black River RAP and Watershed Initiative, Ohio

www.epa.state.oh.us/dsw/rap/blk_home.html
www.epa.gov/glnpo/aoc/blackriver.html
www.noaca.org/blkrap.html
www.blackriverwatershed.org

History

The Black River RAP process began in 1991 with the establishment of the Black River Coordinating Committee (BRCC) by Ohio EPA. The group represents a diverse membership and plays an active role in development and implementation of the RAP, not just an advisory role. Originally, the AOC included only the lower mainstem, due to many industrial operations and wastewater treatment plant discharges. Sediments had been contaminated with PAHs from a steel mill coking facility and there was a high incidence of fish tumors. Prior to the initiation of the RAP process, many of the discharges had been discontinued or remediated. Due to increasing pressure from non-point sources, the BRCC expanded the AOC boundaries to include the entire watershed, which is largely agricultural and rural. The PAH contaminated sediments were removed in 1990 under an enforcement action. The 1994 Stage 1 RAP identified 10 beneficial use impairments including: restrictions on fish and wildlife consumption; degradation of fish and wildlife populations; fish tumors or other deformities; degradation of benthos; restrictions on dredging; eutrophication; restrictions on drinking water consumption; beach closings; degradation of aesthetics; and loss of fish and wildlife habitat.

The RAP adopted a Riparian Corridor Resolution in 1996 that outlined the need for riparian corridor establishment and protection. A Strategic Long Range plan was developed in 1997. The RAP received national attention with the construction of a fish habitat shelf along the lower river at the Black River Landing brownfield remediation site. Since its construction, a dramatic improvement has been seen in the local fish community structure. In partnership with the US Army Corps of Engineers under a WRDA 401 project, the RAP participated in the development of French Creek specific watershed guide to assist landowners and elected officials in making decisions that better protect the environment and the creek. This was the RAP's first product in its attempt to tackle nonpoint source issues by breaking the AOC down into subwatersheds.

Progress since 2004 LaMP Report

Since the remediation of the PAH-contaminated sediments, the incidence of tumors and other deformities in fish in the lower river has continued to decline. On Earth Day 2004, the tumor BUI status was changed from impaired to "in recovery". The contact advisory listed in 1983 was also rescinded that day. Benthic communities in the East Branch have improved dramatically. All areas now meet Ohio EPA warmwater habitat biological criteria for benthos, and some areas are approaching exceptional warmwater habitat criteria. This portion of the AOC is under considerable development pressure and in need of protection. The Black River RAP decided a formal delisting of the benthos impairment for the East Branch would be the best method to publicize the improvement and garner local support to protect the waterway. U.S.EPA approved the delisting for this BUI in 2005.

Improvements in wastewater treatment plant discharges along the East Branch also led to significant reduction in algal growth downstream from the Grafton wastewater treatment plant.

In the fall of 2004, the Black River RAP received the Lake Erie Award from the Ohio Lake Erie Commission for its outstanding contributions towards the restoration and protection of the waterways of Ohio's Great Lake.

Recognizing that land use and stream stewardship are better directed at the local level, the Black River RAP has been dedicating considerable effort toward the development of subwatershed groups. The AOC has been divided into six subwatersheds: the mainstem; French Creek; the West Branch; Plum Creek; the northern East Branch; and the Southern East Branch. Various studies and projects have been initiated in all these subwatersheds.

In 2003, funded by a grant from U.S.EPA on behalf of the Lake Erie Public Forum, the Lorain County Community Development Department was able to hire a local watershed coordinator. The primary role of the coordinator was to initiate development of a watershed plan on the West Branch, a tributary highly impacted by agricultural runoff. A local advisory board was established and draft watershed plan prepared. Several workshops have been held to provide instruction on the proper application of atrazine and options to reduce its use. Under subsequent grants from U.S.EPA and the Ohio Coastal Management Program, the local watershed coordinator's role expanded to also include French Creek, Plum Creek and northern East Branch tributaries.

Using simplistic testing for *E. coli*, monitoring has been initiated to determine the more polluted areas in the watershed and the sources. Efforts have also begun to get the members of the watershed groups involved in collecting water quality data from the streams.

Next Steps

- Working with the Lorain County Community Development Department watershed coordinator, the RAP is creating a watershed group for French Creek and continuing planning for the West Branch.
- A TMDL is underway for the Black River and will further define limits for identified contaminants of concern.
- The Black River RAP has adopted the Delisting Targets for Ohio Areas of Concern (Ohio EPA, 2005) and will be reassessing BUIs for each subwatershed based on these targets.
- Use of "sediment sticks" by volunteer monitors is planned to test the concentrations of suspended sediments (as a measure of turbidity) and determine the areas contributing the largest sediment loads. In association with the sediment stick monitoring, Ohio EPA will conduct biological monitoring along the West Branch to calculate fish IBIs and test the correlation between turbidity and the quality of the fish community.
- The Black River AOC continues to experience impacts from sediment loads, bacteria and nutrients. Properly managing urban, suburban and rural land use practices throughout the AOC, including the enhancement and protection of the riparian corridors and wetlands, will improve the quality and productivity of the Black River. The Black River Watershed Initiative and the Black River RAP will continue to coordinate on the organization and implementation of monitoring and remedial actions needed to restore the entire Black River watershed.

Maumee River RAP, Ohio
www.maumeerap.org

History

The Maumee RAP process began in 1987, coincidently as the IJC unveiled the 1987 version of the Great Lakes Water Quality Agreement at their biennial meeting in Toledo. The Stage 1 Report was written by the diverse membership of the Water Quality Subcommittee under the Toledo Metropolitan Area Council of Governments, with oversight by Ohio EPA. The boundaries of the AOC include the mainstem of the Maumee River from RM 22.8 to Maumee Bay, Duck Creek, Otter Creek, Cedar Creek, Grassy Creek, Crane Creek, Swan Creek, and the Ottawa River. In 1992, the AOC was expanded to include Packer Creek, Turtle Creek, Rusha Creek and the Toussaint River, all east of the Maumee mainstem and direct tributaries to Lake Erie. The 1990 Stage 1 Report identified 10 beneficial use impairments including: restrictions on fish and wildlife consumption; degraded fish and wildlife populations; fish tumors or other deformities; degradation of benthos; restrictions on dredging; restrictions on drinking water; eutrophication; beach closings; degradation of aesthetics; and loss of fish and wildlife habitat.

The Maumee RAP Committee makes formal decisions for the organization and oversees eight action groups. The action groups are classified as issue, support or watershed-specific. The RAP continues a very active public outreach and education program. They have held workshops covering such topics as: agricultural runoff and best management practices; urban storm water runoff; pollution prevention; drinking water and pesticides; watershed planning; environmental risk, etc. A Recommendations for Implementation Report was completed in 1991. A 10-year Activities and Accomplishments Report was completed in 2002 and set the stage for identifying next steps toward restoration. Much work has been done on the Ottawa River, the most contaminated part of the Maumee AOC. Remedial actions at the Dura, Stickney, Tyler and King Road landfills have reduced significant loads of PCBs to the Ottawa River. Soil and sediment remediation at the Texileather and Fraleigh Creek sites removed more than 57,000 lbs of PCBs from the river. Extensive additional work has been done to further characterize contaminated sediment levels and locations, assess environmental and human health risk, and prioritize river segments for clean up. An award winning documentary entitled: Fate of a River Revisited was broadcast on PBS and continues to be shown to local groups.

Progress since 2004 LaMP Report

An intensive multi-media public education campaign, entitled “Give Water a Hand”, was recently completed. Its aim was to address some of the requirements for Phase 2 Storm water regulations and alert folks to the importance of water conservation, septic system maintenance and storm water management. The success of this program led to the initiation of a similar campaign to be focused on small business.

The Maumee RAP undertook an intensive and ambitious effort to create the Maumee AOC Stage 2 Watershed Restoration Plan. This plan combines the IJC requirements of a Stage 2, U.S. EPA and Ohio requirements for a watershed action plan, attention to the non-point source management measures of the Ohio Coastal Management Plan, and consideration of TMDL and natural resource damage investigations in the AOC. The plan underwent public review in November 2005 was submitted to Ohio EPA, U.S. EPA and the IJC for review in early 2006.

A GIS based wetlands inventory of Lucas County was completed for use in identifying wetlands for protection and as mitigation sites. Projects for restoring wetlands in both Duck and Otter Creek watersheds are underway.

A grant was received from U.S. EPA/GLNPO to conduct the first phase of an ecological and human health risk assessment for Duck and Otter Creeks.

A Longterm Control Plan (LTCP) to address Toledo bypasses and CSOs was approved.

Next Steps

- The Stage 2 Watershed Restoration Plan provides a comprehensive list of actions needed to restore the AOC. Once this plan is approved by Ohio EPA/U.S. EPA/IJC, local organizations agencies need to buy in to the plan and implement the components applicable to their mission and authorities.
- Funding is needed to complete Phase 2 of the risk assessment for Duck and Otter Creeks to determine the need for sediment remediation.
- An application was submitted to conduct sediment remediation on the Ottawa River under the Great Lakes Legacy Act (GLLA). Initial GLLA review required additional sampling to better describe the project components. Sampling was done by GLNPO in 2005 and results are being analyzed for next steps.
- Field data for much of the AOC has become dated. The RAP petitioned Ohio EPA to accelerate the TMDL schedule for Swan Creek, Duck Creek and several smaller tributaries near the mouth of the Maumee River. The request was approved and field sampling will be done in 2006. This information will allow the RAP to reassess the beneficial use impairments in these segments and help prioritize remedial actions needed. A TMDL for the Toussaint River is underway.
- Dam removal and stream restoration is planned for the mid Ottawa River. Contact and fish consumption advisories in the area will be reviewed to determine if they are still relevant.
- A larger watershed plan development project has been initiated for the entire Maumee River basin under a congressional line item request to the USACE and NRCS. The RAP will be involved to connect their efforts with the new ones to work toward the goal of improving the ultimate discharge of the river to Maumee Bay and the western basin.

River Raisin RAP, Michigan

www.riverraisin.org
www.epa.gov/glnpo/aoc/rvraisin.html
www.riverraisin.org/raisin_projects/river_raisin_area_of_concern.html

History

Located in Monroe County, Michigan, the AOC includes the lower 2.6 miles of the River Raisin from the low head dam (#6) and extends half a mile out into Lake Erie. It also includes the nearshore zone of Lake Erie north and south of the river mouth. The River Raisin AOC has nine beneficial use impairments including: fish and wildlife consumption advisories; degraded fish and wildlife populations; bird or animal deformities or reproductive problems; degraded benthos; dredging restrictions; eutrophication; beach closings; degradation of aesthetics; and loss of fish and wildlife habitat. The impairments are primarily due to historical discharges of oil and grease, heavy metals, and polychlorinated biphenyls (PCBs) from industrial facilities that have contaminated sediments in the river. In addition, industrial and municipal waste discharges and changes in water flow have historically caused problems with eutrophication and high levels of *E. coli*.

Progress since 2004 LaMP Report

Automotive Components Holdings, LLC (ACH) and the U.S. Fish and Wildlife Service entered into a cooperative management agreement in 2005 to incorporate 240 acres of coastal wetlands, called Eagle Island Marsh, into the Detroit River International Wildlife Refuge. The Eagle Island Marsh is located behind the ACH plant and is bordered by the Sterling State Park to the north, Lake Erie to the east, and the River Raisin to the south. This large wetland complex is unique to the region and contains marshland, transitional meadows and forested wetlands. Eagle Island Marsh supports significant beds of the threatened American Lotus, a pale yellow flower that is the nation's largest aquatic wildflower and the official clean water symbol of the State of Michigan.

The City of Monroe was awarded an MDEQ Coastal Management Program grant in 2004 to conduct a field assessment of all open waterways within the city. This comprehensive

assessment will identify BUIs, identify best management practices to address the BUIs, and will provide a means to implement natural resource conservation programs to restore the BUIs.

In 2004, the MDEQ nominated the River Raisin AOC for project funding consideration under the Great Lakes Legacy Act. The nomination is currently pending action by the U.S.EPA Superfund program.

The MDEQ and U.S.EPA-GLNPO conducted pre- and post-navigational dredging surveys for PCBs in 2003 and 2004. Sampling included volatile organics, metals, PCBs, oil and grease, whole sediment bioaccumulation tests, caged fish, and edible portion fish tissue sampling. PCBs from the turning basin downstream were identified as the main contamination "hot spot". The studies indicated that there is significant potential for uptake of PCBs into the food web. An addendum was completed for the remedial alternatives evaluation report, recommending dredging of contaminated sites, particularly the turning basin, in the AOC.

The River Raisin Watershed Council was awarded $12,800 in grant funds in 2003 to conduct a benthic macroinvertebrate community and stream habitat assessment in the River Raisin Watershed.

Next Steps:

- The Public Advisory Council will be working with the MDEQ in the upcoming year to integrate locally-derived goals and restoration targets with the statewide restoration criteria.

Rouge River Area of Concern, Michigan
www.rougeriver.com

History

The Rouge River watershed is an urban/suburban watershed of 48 communities that drains 466 square miles of southeastern Michigan and discharges into the Detroit River. It is the oldest, most heavily populated and industrialized area in southeast Michigan. The river has four main branches totaling 125 miles of waterways, includes 400 lakes and ponds, and provides recreational opportunities for more than 1.5 million people. The AOC includes the entire watershed.

The Rouge River AOC has nine beneficial use impairments. These include: restrictions on fish and wildlife consumption; degraded fish and wildlife populations; fish tumors or other deformities; degraded benthos; dredging restrictions; eutrophication; beach closings; degraded aesthetics; and loss of fish and wildlife habitat. The Rouge River suffers from typical urban watershed stressors including discharges from combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), non-point sources, limited industrial discharges, contaminated sediments and high flow variability. These factors have resulted in public health advisories for fish consumption and water recreation, poor biotic communities, impoundment eutrophication, and damage to the stream channel morphology.

Progress since 2004 LaMP Report

The Rouge River Watershed Local Management Assembly is a voluntary organization of 38 local municipal governments and three counties located in part or totally within the Rouge River watershed. The Assembly worked to get passage of the Watershed Alliance legislation, Act No. 517, on January 3, 2005. This legislation authorizes the organization to function as a legal inter-governmental entity capable of seeking grants and other sources of outside funding to implement watershed management plans. The Assembly is now in the process of transitioning into a new organization called the Alliance of Rouge Communities (ARC) in an effort to meet the requirements of the Watershed Alliance law.

In October 2005, the Rouge River Remedial Action Plan Advisory Council (RRAC) released the Rouge River Report Card, which is a reader-friendly summary of the status of BUIs in the Rouge River AOC.

In 2004, the Rouge River Remedial Action Plan was updated and revised. The plan defined an ambitious 20-year program of actions needed to realize the vision of: "A Rouge River Watershed that is aesthetically pleasing, clean and safe, that supports a healthy,

diverse fish and wildlife community, and that provides an enriching variety of recreational experiences." The document also identified six BUIs that might be ready for removal/delisting.

Continued monitoring has shown improved water quality. Dissolved oxygen levels are higher at most monitoring stations compared to five years ago, and bacteria counts are declining. There have been numerous habitat restoration and streambank stabilization projects conducted throughout the Rouge River watershed.

All 10 Combined Sewer Overflow (CSO) retention/treatment basins planned under Phase 1 of the Rouge watershed CSO control program continue to operate and are removing a significant source of untreated sewage overflow to the Rouge River. A total of 77 of the 83 Phase 1 CSO outfalls are now under control (basins) or have been eliminated by sewer separation. The West Dearborn CSO control program Phase A project is under construction. The City of Detroit Upper Rouge Tunnel is under design.

Thirty-six new grant-funded community projects were awarded in 2004, of which 32 projects have been completed and are consistent with the seven Rouge Subwatershed Management Plans.

Next Steps

- In 2005, Friends of the Rouge River received a U.S.EPA-GLNPO grant to develop a comprehensive GIS database of critical habitat areas. The GIS database will be used as a tool to set measurable restoration and delisting goals for fish and wildlife habitat BUIs identified in the Rouge River AOC.
- The Friends of the Rouge River received a Michigan DEQ volunteer monitoring grant in 2004 to continue its Rouge River benthic monitoring and frog and toad survey programs. This work is ongoing.

Detroit River RAP (Bi-national)

History

The Detroit River is a 51 km (32 m) connecting channel between Lake St. Clair and Lake Erie. The bi-national AOC includes the Detroit River and its watersheds, covering an area of over 2000 km^2. Over 75% of the total land area is in Michigan. The Canadian portion of the AOC is approximately 60,000 hectares and includes virtually all of the municipalities of Windsor and LaSalle, and parts of Amherstburg, Tecumseh, Kingsville and Essex. Some 100 communities rely on the river for drinking water with most of the population concentrated in the cities of Detroit, MI and Windsor, ON.

In the original Stage One RAP, only eight of the 14 BUIs were thought to be impacted. However, additional research has now demonstrated that 11 of the 14 BUIs are likely impaired. The impairments are a result of a number of factors, including historical industrial activity, agricultural practices, and urban development in the watershed. Major sources of impairment to the bi-national AOC are from CSOs, sanitary sewer overflows, municipal and industrial discharges, storm water runoff, and loss of habitat for fish and wildlife. Due to high volumes of water entering the river, upstream sources contribute considerable contaminant loads. The river is the single largest source of contaminants to Lake Erie.

Distinct RAP implementation frameworks have been developed for the Canadian and Michigan sides of the AOC, under the guidance of the 1998 Four Agency Letter of Commitment signed by Environment Canada, U.S. EPA, Ontario Ministry of the Environment, and Michigan Department of Environmental Quality. The Detroit River RAP Team guides the U.S. implementation. The Detroit River Canadian Cleanup (DRCC) process guides Canadian implementation efforts. The DRCC is organized into: the Detroit River Canadian Steering Committee comprised of senior managers; the Detroit River Canadian Implementation Committee comprised of technical Agency representatives; Detroit River Canadian Public Advisory Committee; and the Detroit River Outreach and Communication Committee.

Jointly, the Detroit River RAP Team and the DRCC are working toward fostering actions that will improve the conditions of impaired beneficial uses.

U.S. (Michigan)

www.detroitriver.org

Progress since 2004 LaMP Report

In 2005, Friends of Detroit River (FDR) agreed to take the lead role as coordinator of the U.S. Detroit River Public Advisory Council. FDR has reconvened the Public Advisory Council (PAC) to engage the community in the restoration of the AOC.

In 2004 the Detroit River AOC was chosen as the first Great Lakes Legacy Act site for the dredging of Black Lagoon contaminated sediments. Removal of Black Lagoon contaminated sediments was a key remedial action identified in the 1996 RAP. The project dredged 115,600 cubic yards of contaminated sediments, and was completed in September 2005.

Next Steps

- The U.S. Detroit River Public Advisory Council plans to focus its activities towards adopting bi-national delisting criteria and a Stage 2 RAP report beginning in 2006.
- U.S. EPA awarded a grant in 2005 to MDEQ for a project to identify non-point and non-traditional pollutants in the Detroit River AOC. Work on the project will be completed in 2006-2007.

Canada (Ontario)

www.detroitriver.ca

Progress since 2004 LaMP Report

The Detroit River Canadian Cleanup (DRCC) continues to be the local RAP coordinating body on the Canadian side. DRCC activities are supported by an Implementation Specialist (funded jointly by the federal and provincial governments) who organizes DRCC activities and serves as a point person for the Canadian RAP. Early in 2005, the DRCC developed a master five-year work plan, including activities of all committees. Activities are prioritized on an annual basis, which allows for the adaptation of the plan to changing needs and conditions.

In 2005, the DRCC finalized delisting criteria for the Canadian portion of the Detroit River RAP. A public-friendly report outlining the criteria was prepared to educate the public about the RAP process. There is acknowledgment that there may need to be future modifications to these criteria, and that there is still a need for bi-national criteria, but the passage of these interim targets was an exciting event.

One of the key focuses of the DRCC recently has been on research and monitoring. In 2004, the DRCC was one of the conveners of the State of the Strait Conference, with a focus on "monitoring for sound management". The Great Lakes Institute for Environmental Research has continued its focus on the Detroit River with sediment sampling work over the past several years. The sampling includes areas all along the corridor, which allows for a big-picture view of sediment issues in the corridor ecosystem.

A DRCC Monitoring and Research Work Group was formed in 2004, and has developed a Monitoring Framework Plan for the river. The Plan sets ambitious goals for ongoing whole-river monitoring activities in the river and corridor. Part of the role of this Work Group is to update the status of the BUIs in the river and that task has already been initiated. An update of the status based on existing information is expected to be completed by mid-2006, while a comprehensive assessment of BUI status is anticipated for December 2007.

Another specific area of research being pursued is contamination in the Turkey Creek watershed. Research has demonstrated elevated contaminant levels in both Turkey Creek and Little River, and a multi-stakeholder group is working to track down the source of the problem. This effort is supported by a 2005 background investigation report into these watercourses that brought together all existing information and research.

Utilizing funding from Environment Canada, the Essex Region Conservation Authority (ERCA) has completed surface water quality monitoring for conventional pollutants at 18 sites around the AOC.

Another major RAP focus is the improvement of fish and wildlife habitat. The Habitat Work Group has made a substantial start on developing a prioritized aquatic habitat management plan for the river. This is a positive addition to the ongoing RAP focus on terrestrial and riparian areas. Large-scale habitat restoration projects have been completed

in the watershed every year by the ERCA and the Essex County Stewardship Network, and increasingly, these projects are including wetland and fish habitat components. Other smaller-scale habitat restoration projects are undertaken by public watershed groups on a semi-annual basis, and include some large, ongoing projects such as the 'cloverleaf' naturalization project in the Little River watershed. Efforts to improve habitat for bald eagles have also been a focus of activity. An existing nesting site on Peche Island has been supported by the erection of platforms that are more stable than the existing nesting tree. The project also involves efforts to track eaglets once they leave the nest to learn about their movements and efforts to raise public awareness about the need for quality habitat in the Detroit River watershed to support key sentinel species like bald eagles.

Seventy-seven agricultural BMP projects including the installation of buffer strips, rock chutes, tree plantings and septic system upgrades have been completed through ERCA's NPS grant program, utilizing funding from Environment Canada. In 2004, over 900 ft. of shoreline was enhanced using soft engineering techniques at Parks Canada's Fort Malden National Historic Site.

A number of efforts have been made to reach out to the public to provide education about the RAP process, to involve them in the process, and to encourage them to seek commitment to the RAP from government officials. A number of public workshops have been held, including ones focused on research and habitat. A new display was purchased in 2004 to provide updated information, and an extended newsletter was published in 2005. This newsletter is in addition to other publications focused on specific topics such as naturalization and water conservation. Efforts by the Public Advisory Council to bring more members of the general public into the process are ongoing.

In 2004, a very successful Household Mercury Collection was held, which brought in over 220 pounds of mercury during a one-month period. That project was followed up by the publication and distribution of a fact sheet about fluorescent light bulbs and steps that businesses should take to dispose of them. Another phase of the project is planned for early 2006, where pharmaceuticals as well as household mercury items will be collected.

Many organizational members of the DRCC continue to undertake remedial actions within their own organizations, frequently seeking the endorsement or support of the DRCC for the projects. These projects include sewage treatment plant upgrades (Lou Romano Plant upgrade expected to be completed in 2006, Amherstburg environment assessment of the upgrade is nearly complete), habitat restoration, non-point source pollution prevention, scientific research, and combined sewer overflow management.

Next Steps

- The development of true bi-national delisting criteria is a priority, and should aid in moving the remediation process along.
- Another much-anticipated development is the planned completion of the BUI status updates in 2006 and 2007.
- Funding renewal for the Implementation Specialist position will be required in 2006, and is critical to the ongoing success of the RAP.
- Other Canadian RAP activities that are ongoing are the implementation of the Monitoring and Research Plan, finalization of an Aquatic Habitat Management Plan, and ongoing work with municipalities to protect habitat and reduce municipal loadings. An ongoing focus on habitat restoration and rural NPS projects is needed to achieve natural areas cover and tributary water quality targets.
- The Public Advisory Council is preparing a series of report cards addressing BUIs, beginning with #1 (fish consumption advisories) in 2006, and is also looking forward to increased involvement with the new US PAC.
- A household hazardous waste collection will be held in 2006 to include both mercury and pharmaceuticals.

Clinton River RAP, Michigan
www.crwc.org/rap/raphome.html

History

Located just north of Detroit and flowing 80 miles from its headwaters into Lake St. Clair near the city of Mount Clemens, the Clinton River drains 1,968 km^2 (760 square miles) of southeastern Michigan, including portions of Oakland and Macomb Counties and small areas of St. Clair and Lapeer Counties. The AOC includes the entire Clinton River watershed, as well as a portion of Lake St. Clair immediately downstream of the mouth of the Clinton River. There are eight beneficial use impairments in the Clinton River AOC including: fish and wildlife consumption advisories; degraded fish and wildlife populations; degraded benthos; dredging restrictions; eutrophication; beach closings; degradation of aesthetics; and loss of fish and wildlife habitat.

Although historical industrial and municipal discharges were the primary causes of environmental degradation in the Clinton River, ongoing contamination problems are almost exclusively of non-point source origin. Land use in the watershed is predominantly commercial and residential, although agriculture is still common in the North Branch subwatershed. The main industries in the area are automotive-related. Stormwater runoff, including the two municipal systems still experiencing combined sewer overflows, is the greatest source of water quality degradation.

Clinton River priorities include elimination of combined sewer overflows and separate sanitary overflows, non-point source pollution control, superfund waste site remediation, spill notification, habitat restoration, and elimination of illicit sewer connections and failing septic systems.

Progress since 2004 LaMP Report

The Public Advisory Council (PAC) received a grant from the Great Lakes Commission to develop delisting criteria for six of the Clinton River AOC beneficial use impairments (BUIs) in 2004-2005. A technical committee of the PAC has been working with consultants over the past year to develop locally-derived delisting criteria that are consistent with Michigan Department of Environmental Quality's Guidance for Delisting Michigan's Great Lakes Areas of Concern.

Oakland University received a grant to conduct an assessment of contaminated sediments in 2003-2005.

The Clinton River Watershed Council launched a major stormwater education effort in 2004.

The Clinton River Watershed Council launched the Adopt-A-Stream volunteer river monitoring program in spring 2005. More than 150 volunteers were recruited to monitor two dozen sites in the first year of the program.

Seven subwatershed planning groups consisting of more than 50 communities and county agencies have formed since 2001, and are currently developing subwatershed management plans and Storm Water Pollution Prevention Initiatives as part of the requirements of the National Pollutant Discharge Elimination System (NPDES) Phase II stormwater permit.

Next Steps

- The Clinton River PAC received a grant from U.S. EPA-GLNPO in 2005 to build on their work in setting restoration/delisting targets for their BUIs. The project is just underway, and will result in the development of delisting targets for fish and wildlife populations, habitat, and benthic community BUIs, and will update the RAP to reflect those targets.
- All 42 municipalities that must comply with the NPDES Phase II stormwater permit decided to apply for Michigan's watershed-based permit, and have thus formed subwatershed planning groups that meet monthly to work on watershed planning and stormwater management initiatives.
- The Macomb County Health Department is currently working to identify and remediate bacterial sources throughout the watershed, and a number of communities are actively working on upgrading the wastewater treatment system.

- The Clinton River Watershed Council will continue to coordinate major public education and outreach events, including River Day and Clinton Clean-Up, in collaboration with many local governments and community organizations.

St. Clair River RAP (U.S. and Canada)
www.friendsofstclair.ca/rap/

History

The St. Clair River flows southward about 40 miles (64 km) connecting the southern tip of Lake Huron to Lake St. Clair. The river is part of the boundary between the United States and Canada. The St. Clair River branches into several channels near its mouth at Lake St. Clair, creating a broad delta region. The AOC includes these important wetlands from St. Johns Marsh on the west (near Anchor Bay, Michigan) to the north shore of Mitchell's Bay in Ontario. Agriculture is the predominant land use within the river's watershed, but intensive industrial development has occurred in and near the cities of Port Huron and Sarnia.

The St. Clair River AOC has ten beneficial use impairments (BUI): restrictions on fish consumption; fish tainting; bird and animal deformities; degraded benthos; restrictions on dredging; restrictions on drinking water consumption and taste and odor problems; beach closings; degradation of aesthetics; added cost to agriculture and industry; and loss of fish and wildlife habitat. The impairments are primarily due to intensive agriculture and industrial development in and near the cities of Port Huron and Sarnia. The heaviest concentration of industry (including a large petrochemical complex) lies along the Ontario shore near Sarnia. Several communities along the St. Clair rely on the river as their primary source of drinking water. Industries, including petroleum refineries, chemical manufacturers, paper mills, salt producers and electric power plants, need high quality water for their operations as well. Ships carrying cargo between the upper and lower Great Lakes ply the St. Clair River.

St. Clair River RAP priorities include contaminated sediment remediation on the Canadian side of the river, elimination of combined sewer overflows and sanitary sewer overflows on both sides of the river, elimination of spills to the river from sources downstream of Sarnia, Ontario, and ensuring proper notification when spills do occur.

Progress since 2004 LaMP Report

A total of 13,370 m^3 of mercury-contaminated sediment were removed from offshore of Dow Chemical Canada Inc.

A St. Clair RAP Progress report was completed in 2005. The report highlighted remedial actions that have been completed the last four years, and evaluated the status of the 10 BUIs in the St. Clair River AOC.

In the fall of 2005, a St. Clair River RAP Canadian Implementation Committee was re-established to guide implementation of the remaining remedial actions on the Canadian side of the AOC. Actions on the U.S. side of the AOC are coordinated by the U.S.EPA and Michigan DEQ, who also informally participate on the Canadian committee as needed.

In 2005, wetlands were created on the ICI Phosphate site near Corruna, ON in order to treat wastewater prior to discharging into the St. Clair River. Work undertaken on this site is a part of the long term site restoration plan.

In 2005, a 50-acre naturalization project on Terra Industries property directly adjacent to the St. Clair River south of Sarnia was completed that included planting and restoration of trees and shrubs, tall grass prairie and wetlands. Terra Industries Inc. (which is a nitrogen-producing facility) provided the land, and the work was carried out by the St. Clair Region Conservation Authority, Rural Lambton Stewardship Network and Ducks Unlimited Canada.

Next Steps

- The current St. Clair River AOC delisting criteria are not specific enough to determine restoration success for all of the BUIs. In 2006, the Canadian Implementation Committee, Michigan DEQ, and the U.S.EPA in consultation with the Bi-national Public Advisory Council (BPAC), will begin to refine the delisting criteria based on current U.S. and Canadian federal and state/provincial guidance and standards.

- The BPAC plans to develop a brief "Report Card" public outreach tool that would highlight the issues in the AOCs, track restoration progress, and engage the local communities in the efforts to restore the AOC.
- In May 2005, Macomb and St. Clair Counties received a $1 million federal earmark to establish water quality monitoring for the St. Clair River and Lake St. Clair. A work plan for the project is currently being negotiated between U.S.EPA and contractors for Macomb and St. Clair Counties.
- Additional contaminant monitoring and effects studies are planned that will assess the status of the degradation to benthos, fish consumption advisories and bird and animal deformities BUIs.
- A facilitated workshop will be held in early 2006 to comprehensively assess habitat gains and losses in the AOC, identify potential for aquatic restoration and review the delisting criteria.

Wheatley Harbour RAP, Ontario
www.on.ec.gc.ca/water/raps/wheatley/intro_e.html

History

Wheatley Harbour is a small, confined harbour on the north shore of Lake Erie. It is the busiest commercial fishing harbour in Ontario, the centre of the province's commercial fish processing industry, an access point for Lake Erie sport fishing, and supports a commercial baitfish fishery. It was originally listed as an AOC because of dissolved oxygen depletion, elevated bacterial levels, nutrient enrichment, and PCB contamination of sediments. The AOC encompasses the harbour proper and the wetlands in lower Muddy Creek, a small tributary that flows into the AOC from the north.

A combined Stage 1/Stage 2 report was completed in 1998. The report highlighted five environmental concerns – contaminants in sediments, high phosphorus concentrations, poor water clarity, bacterial contamination, and habitat loss – that result in the following beneficial use impairments: restrictions on fish consumption; restrictions on dredging activities; eutrophication or undesirable algae; loss of fish and wildlife habitat; and degradation of fish and wildlife populations (not solely attributed to factors in the AOC).

A progress report updating the status of the AOC was completed in November 2002.

Progress since 2004 LaMP Report

The following activities have been undertaken in the AOC since the 2004 LaMP update report:

RAP Management and Coordination

- The Wheatley Harbour Implementation Team (WHIT) was formed in January 2004, with representation from Environment Canada, Ontario Ministry of the Environment, Ontario Ministry of Natural Resources, Ontario Ministry of Agriculture and Food, Essex Region Conservation Authority, and the Essex County Stewardship Network.
- A comprehensive work plan for 2005-2007 was produced in June 2005 that outlines the activities to be pursued in order to complete all actions toward delisting of the AOC.
- A review of the RAP delisting criteria was initiated in fall 2004.
- A draft RAP update report for the time period 2001-2003 was completed in June 2004.

Workshops and Outreach

- A two-day State of Wheatley Harbour Workshop was held in April 2005. The workshop brought together federal and provincial government management, research and implementation staff to review the most current information on the environmental conditions of the AOC. The meeting provided a forum for discussion about information gaps and needs and future directions.
- Public outreach was re-initiated via a meeting with the Southwest Outdoors Club, a new, 200-member hunting and fishing club based out of Wheatley.

Monitoring, Research and Implementation

- A total of 40 non-point source projects were conducted within the Muddy Creek watershed. These projects, including 23 septic system upgrades, eight tree plantings, seven buffer strips, and two soil erosion protection projects, resulted in improvements in the quality of water entering the AOC.
- A total of five habitat restoration projects were conducted in the AOC-proper, resulting in 6.4 hectares of habitat restored.
- Wetland sediment and concurrent young-of-year fish sampling were conducted in December 2004. The data were used to develop a contaminants pathway model in June 2005.
- Historical dredge disposal sites on the east and west sides of the wetland were sampled in August 2004 and laboratory analyses for PCBs conducted and finalized in March 2005.
- Electromagnetic testing was conducted in spring 2005 to follow up on anecdotal information concerning electrical transformers buried on the east side of the wetland.
- All outfalls draining into the harbour were located and mapped in September 2005 and sampled for PCB analysis in November 2005.
- Fish and snapping turtle health effects results (based on 2001 and 2002 sampling) were completed in March 2005.
- A study of wetland hydrology (water flow) and sediment transport (re-suspension) and of the two PCB hotspots was initiated in September 2005.

Next Steps

- PCB track-down activities will be completed, including sediment sampling of historic dredge disposal sites, water sampling at outfalls, and core sampling at wetland PCB hotspots. The purpose of this work is to determine whether active sources of PCBs remain in the AOC. The sediment core sampling will be used to estimate the volume of contaminated sediment and will inform the development of a sediment remediation plan.
- Further non-point source and habitat restoration work upstream of the AOC will be done to continue to improve the quality of water entering the AOC from the upstream areas.
- The hydrology/sediment study that was initiated in September 2005 will be continued. This work will lead to a better understanding of water, sediment and contaminant flow within the Muddy Creek wetland and, combined with the results of the track-down activities, will allow an understanding of why PCB levels in the wetland sediments have not really declined over the last 20 years.

9.3 Watershed Projects

Erie and Cattaraugus County Watershed Projects, New York

History

The Erie County Soil and Water Conservation District develops and implements a wide range of projects addressing habitat, streambank stabilization, erosion control, nutrient management, agricultural environmental management planning, non-point source, stewardship, and forest/community management. Other projects by environmental and governmental organizations address land use, urban sprawl, large animal farms, stormwater, construction, conservation incentives, water quality, and public access.

Progress since LaMP 2004 Report

A number of land, stream, and, watershed restoration and protection projects are ongoing and planned in these counties.

Next Steps

- In Cattaraugus County, a watershed protection project has been funded for Cattaraugus Creek that has two main components: 1) a technical study of sediment transport and quality in highly erosive areas with a hydrologic model to address loadings; and 2) a community vision development for a stream corridor strategy. Issues to be addressed include land use, urban sprawl, and watershed protection. This funded grant project is led by New York Rivers United of which The Nature Conservancy and Cattaraugus County government agencies are primary partners.

Lake St. Clair Program (Bi-national)

Lake St. Clair, together with the St. Clair River and the Detroit River, provide the connecting channel between Lakes Huron and Erie and forms part of the international boundary between Canada and the United States. Significant tributaries to the lake include the Sydenham and Thames Rivers (Canadian) and the Clinton River (US). The total drainage basin area is 13,500 km^2 with 23% draining U.S. lands and 77% draining Canadian lands.

The need for a Lake St. Clair focus to coordinate and communicate the various on-going programs and to identify areas where work is needed was recognized by the four lead government agencies (Environment Canada, U.S.EPA, Ontario Ministry of Environment and Michigan Department of Environmental Quality) and in 2000 they approved a resolution to include Lake St. Clair under the Four Agency Letter of Commitment. Under this commitment, a framework for managing Lake St. Clair was completed, a bi-national monitoring committee (MUGLCC) established, and two bi-national monitoring activities inventories (MUGLCC 2000 and 2002) have been published.

The key elements that form the basis of the management framework are: a Bi-national Partnership Agreement (Four Agency Letter of Commitment); a Bi-national Management Committee (Four Agency Management Committee); a Bi-national Working Group; separate local U.S. and Canadian Watershed Coordinating Committees; and a Biennial State of Lake St. Clair Conference. A very successful 2005 Lake St. Clair Biennial Conference was held September 21-22 in Wallaceburg, Canada. During the two-day conference, about 150 attendees representing science, all levels of government, non-governmental organizations, and the general public heard from 40 speakers who highlighted environmental monitoring, research, implementation and management actions that have taken place over the last few years. Several themes were explored including: land and water resource uses, environmental monitoring of contaminant sources and trends, human health, fish and wildlife health in the St. Clair watershed, habitat and biodiversity, and physical conditions and processes.

Key stressors that have been identified for the watershed include land use, commercial navigation and recreational navigation. These sources have resulted in increased nutrients and chemicals in water and sediment; increased bacterial levels at beaches; fish consumption advisories; and changes in habitat, fish and wildlife populations, and biodiversity.

U.S.

Progress since 2004 LaMP Report

In 2004, the U.S. National Oceanic and Atmospheric Administration (NOAA) and the Great Lakes Commission completed a two-year cooperative effort culminating in the completion of a Lake St. Clair coastal habitat assessment and integrated coastal management decision support tool (www.glc.org/habitat/icmt.html). The Assessment focuses on Lake St. Clair's coastal environment and brings together recent data and information about the habitats in the 10 mile perimeter surrounding Lake St. Clair. The decision support tool will help users to examine how habitats function, identify and rank landscapes and perform land use scenario testing.

In 2005, the U.S. Army Corps of Engineers released the St. Clair River/Lake St. Clair Comprehensive Management Plan to the public. The Management Plan outlines ten goals for environmental restoration actions needed for Lake St. Clair. These goals are:

- Pollution does not threaten public health and the health of the watershed;
- All biological communities and habitats are healthy, diverse, and self-sustaining;
- Water is safe for drinking;

- Water is safe for swimming;
- Fish and wildlife are safe to consume;
- Land use activities are sustainable and support a healthy watershed;
- Recreation and economic activities impacting the lake are sustainable and support a healthy watershed;
- Data and information are available to ensure informed management decisions;
- All entities responsible for natural resources and environmental protection within the watershed are working together in a collaborative manner to protect and enhance the watershed;
- The public is informed about environmental issues and engaged in activities to restore and protect the lake.

The recommendations in the Management Plan will help to achieve the goals and serve as a basis to guide future US actions and develop priorities for Lake St. Clair. One of the recommendations in the Management Plan was to ensure safe drinking water and, in 2005, Macomb and St. Clair Counties received a $1 million federal earmark for water quality monitoring for the St. Clair River and Lake St. Clair.

Another recommendation in the Management Plan was to "establish a U.S. Lake St. Clair Coordinating Council with representation from federal, state, and local agencies with management responsibilities for the Lake St. Clair watershed to promote and coordinate implementation of the management plan, facilitate communication among stakeholders, establish priorities, monitor progress, and seek funding for management plan activities." In 2005, the local Macomb/St. Clair Inter-County Watershed Management Advisory Group approved a structure that will formally act as the U.S. Lake St. Clair Coordinating Council under the bi-national Four Agency Lake St. Clair management framework. The group will serve as the local US focal point for lake management and provide policy and administrative direction to implement projects and programs within the Lake St. Clair Watershed, using recommendations from the USACE Comprehensive Management Plan as a starting point.

Next Steps

- Macomb County, Michigan, and the U.S. Lake St. Clair Coordinating Council will be developing an implementation strategy to set priorities for more of the recommendations cited in the Management Plan. Macomb and St. Clair Counties, along with the U.S. Lake St. Clair Coordinating Council will develop and implement a drinking water monitoring system for Lake St. Clair and the St. Clair River. The U.S. Coordinating Council will continue their successful efforts to involve relevant Lake St. Clair stakeholders, develop projects, and facilitate funding for future Lake St. Clair actions.

Canada

www.scrca.on.ca/lakestclair.asp

Progress since 2004 LaMP Report

The Lake St. Clair Canadian Watershed Council has released the Lake St. Clair Canadian Watershed Draft Technical Report. The report is an examination of current conditions and identifies management issues. The Council has proposed management recommendations to address the issues identified and has been actively consulting with stakeholders and partners. A final Management Plan including recommendations will be released in 2006.

Next Steps

- The focus for the next two years will be on completing the Management Plan and the corresponding Implementation Strategy.
- Ongoing projects to address non-point sources of pollution, complete a walleye study in the lower Thames River, and continue to develop a corridor-wide hydrology model.

Thames River Watershed, Ontario
www.thamesriver.on.ca
www.lowerthames-conservation.on.ca

History

The Thames River watershed is located in the agricultural heartland of southwestern Ontario. The river is 273 km long and drains a 5,825 km^2 watershed to Lake St. Clair. Flood control reservoirs in the upper portion of the Thames regulate the flow regime of the river. Water quality and aquatic habitat have been altered by land use activities in the watershed. Historical and current land use has resulted in high sediment and nutrient loadings, mainly from non-point sources, and habitat fragmentation and degradation. The Thames contributes the second largest nutrient loadings to Lake Erie, next to the Maumee River in Ohio. The Thames River watershed was identified as a target watershed to implement recommendations from the Lake Erie LaMP. The Upper Thames River Conservation Authority (UTRCA) manages resources in the upper portions of the watershed including London and upstream areas. The Lower Thames Valley Conservation Authority (LTVCA) manages resources in the lower portion from downstream of London to Lake St. Clair. Established in 1947 and 1961, respectively, the UTRCA and LTVCA have well-established watershed management programs. These include flood control, land use and environmental planning, environmental monitoring (surface water, groundwater, fisheries, and species at risk), forestry and agricultural conservation services, community education, and recreation.

Progress since 2004 LaMP Report

Through the Clean Water Program rural landowners receive technical assistance and financial incentives to implement best management practices to reduce rural pollution sources and enhance habitat. In 2004/2005 a total of 204 projects were completed in the Upper Thames watershed.

Hands-on environmental education was provided for 60,000 students since 2004.

An ecosystem-based recovery plan for aquatic species at risk in the Thames River watershed was developed.

Collaboratively with the City of London and a local advisory committee, an updated management plan of the 250 hectare Westminster Ponds/Pond Mills ESA was completed to guide decision-making for the next 10 years.

Ongoing monitoring in the Thames watershed includes surface water chemistry, stream flows, groundwater, fisheries, benthic invertebrate monitoring, and species at risk.

A partnership of agencies (federal, provincial, conservation authorities) and First Nations interested in ecosystem restoration within the Thames River Watershed created the Thames River Ecosystem Restoration Committee in 2003. Current work includes research into walleye survival in the Thames River.

Studies are ongoing with the Ontario Geologic Survey to better define the water bearing zones and to complete a regional groundwater model for Southwestern Ontario.

Work continues to inventory and assess the approximately 225 dams and barriers throughout the watershed and prioritize them for mitigation efforts. Most recently Dingman Creek Weir, located in the City of London, was removed in September 2005 as a result of this work.

Approximately 120,000 trees have been planted for habitat improvement through plantings on private lands and as part of community forestry projects.

Revisions to the Conservation Authorities Act by the Province of Ontario have resulted in a new directive: Ontario Regulation 97/04 – Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. The Generic Regulation will take the place of the Fill, Construction and Alteration to Waterways Regulation by regulating development on defined hazard lands including: erosion hazard lands, flood hazard lands, watercourses, wetlands, other areas of interference surrounding wetlands.

Next Steps

As financial resources become available, the development of an overall watershed plan for the Thames River is a priority. This plan is needed to best direct and target future

implementation actions. Many relevant plans are being developed that are key components of a watershed plan. Some of those currently planned or underway include:

- Source Water Protection Plan: an extensive effort led by the Province of Ontario and facilitated on a watershed scale by the Conservation Authorities to protect drinking water.
- Thames River Fisheries Management Plan: develop updated plan to ensure sustainable management of fisheries resources.
- Oxford County Natural Heritage Study.
- 2006 Watershed Report Cards for each of the 28 subwatersheds in the Upper Thames River watershed.
- Continuing to implement stewardship rural non-point source and habitat projects.

Canadian Western Lake Erie Watersheds (including: Hillman, Lebo, Mill, Sturgeon, Big, Fox, Cedar and Wigle Creek watersheds and Point Pelee National Park)

www.erca.org

History

The Canadian portion of western Lake Erie is entirely within the Essex region, located in extreme southwest Ontario, and encompasses all or part of four municipalities including Leamington, Kingsville, Essex and Amherstburg. The region is formerly a glacial lakebed, and is characterized by predominantly clay soils with a very flat topography. Prior to European settlement most of the region was covered in swamp forest, with extensive coastal marshes and some areas of prairie. European settlement has radically altered the landscape, and today just 7.5% of the region exists as natural area (2.5% wetland and 5% forest with very small remnants of prairie). Similarly, water quality has been degraded by human activities, and the region is a significant contributor of nutrients to the lower Great Lakes. Agricultural land uses (primarily cash crops with significant but localized greenhouse, fruit and vegetable production) covers 80% of the region with urban and rural residential dominating the balance.

Due in part to its southernmost location in Canada, the region supports the highest diversity of flora and fauna in the country. It is in the heart of the Carolinian life zone and is also home to approximately 240 federally and provincially listed species at risk. It is a very special place from a natural environment perspective, and also faces significant and unique resource management challenges. The Lake St. Clair-Detroit River- western basin of Lake Erie corridor encompasses the entire region and has been identified as a priority area for LaMP activities.

A diverse suite of programming has been developed by the Essex Region Conservation Authority and its partners in relation to watershed conservation and restoration, hazard lands and flood management, outdoor recreation, and environmental education.

Progress since 2004 LaMP Report

Progress has continued on a number of activities to restore and protect the watersheds draining into western Lake Erie since 2004. Some of these include:

- Clean Water~Green Spaces – for each of the last two years ERCA's municipally appointed Board of Directors has approved this program that sees over $1 million of local levy flow to natural areas acquisition, water quality improvement and habitat restoration programs.
- Protection of Significant Natural Areas through Acquisition –170 acres of significant natural areas were protected through partnership acquisitions in the Cedar Creek watershed.
- A total of 25 water quality improvement projects were completed in 2005, the first year of the Water Quality Improvement Program, through provision of incentive grants to private landowners. Projects include septic system upgrades, buffer strips, rock chutes and other soil erosion control structures, and abandoned wellhead decommissioning.

- ERCA partnered with landowners to restore almost 20 acres of forest and wetland habitat.
- Under the Essex-Erie Aquatic Species at Risk Recovery Strategy, ERCA worked with the Department of Fisheries and Oceans to initiate a recovery strategy process focusing on fish species at risk.
- ERCA maintains 45 surface water quality monitoring stations and eight groundwater monitoring stations and monitors for various parameters, with emphasis on the conventional pollutants. Water chemistry and benthic invertebrate health is monitored.
- Development of a Source Water Protection Plan to prevent contamination of drinking water (primarily surface waters) was initiated in 2005.

Next Steps

- Expansion of ERCA's water quality and habitat restoration programs are a high priority. This requires continued landowner engagement in addition to enhanced funding.
- Prevention of watershed degradation will also be emphasized over the coming period. This will be achieved through the development of Source Water Protection Plans as well as more effective municipal engagement to mitigate land use impacts.

Kettle Creek Watershed Project, Ontario
www.kettlecreekconservation.on.ca

History

The Kettle Creek watershed is located in southwestern Ontario, bordering on the north central shore of Lake Erie. Kettle Creek is a short, deeply incised watercourse that drains 520 km^2 of intensively used agricultural and urbanized lands to Lake Erie at Port Stanley.

Within the watershed valley the bed of the stream is often more than 100 feet below the level of the surrounding lands. Approximately 80% of the watershed is in agricultural use; 15% is forested or marginal land; and 5% is urbanized. The primary agricultural land use is cash crop, and a moderate amount of specialty cropping also exists. Livestock operations are declining in total number of animals, but the animals are more concentrated in a smaller area. Most agricultural lands are systematically tile drained which, along with municipal drains, has reduced wetland features in the watershed landscape by 80% over historical records.

Shoreline erosion monitoring, development controls or prohibitions, flood proofing of new shoreline development, and shoreline protection activities combine along Kettle Creek's Lake Erie shoreline – which represents the fastest eroding shoreline in the Great Lakes (average of two metres recession per year over 100 years) and the largest lake-induced flood damage centre on the Canadian side of Lake Erie.

The population of the watershed is approximately 65,000 people, with a forecast growth of 50% within the next 20 years. A large, as yet unsettled or developed portion of the City of London is located in the northern headwaters of the watershed. As a result of the afore-noted natural features and land uses, the following natural resource management issues exist:

- Flash flooding but otherwise low, and decreasing surface water flows
- Erosion and sedimentation of watercourses and Lake Erie
- Deforestation, and decreasing water and air quality
- Habitat fragmentation and degradation
- Hazard land management in both riverine and lakeshore environments

Kettle Creek's outflow plume into Lake Erie has been identified as a source of sediments laden with nutrients, mercury, and PAH's - all measurable within Lake Erie at 1 kilometre south and 2 kilometres east of the outlet. Both point and non-point sources within the watershed contribute to the Kettle Creek's impact upon Lake Erie.

Progress since 2004 LaMP Report

Progress has continued on a number of activities to restore and protect the Kettle Creek watershed since 2004. Some of these include:

- Habitat Evaluation and Remedial Measures Targeting: Satellite Imaging, Vegetative Cover Assessment, and Benthic (macroinvertebrate) Assessment all combine to target remedial measures for improvement to water quality potential.
- Reforestation: 120,000 trees planted in watershed to buffer watercourses, create interior forest habitat, improve biodiversity, and reduce water and wind erosion and sedimentation.
- Wetland Creation: 20 acre wetland complex developed through private industry partnership. Lands and funds dedicated to Kettle Creek Conservation Authority (KCCA).
- In partnership with the Lake Erie Binational Public Forum, and funded primarily by U.S.EPA, community perceptions of resource management issues and preferred remedial actions combined to form an action-based strategy for the Dodd Creek and Upper Kettle subwatersheds.
- Hands-on environmental education for 1,500 secondary school students.
- Hayden Woodlot and Lake Margaret Management Area master plans completed to guide conservation and protection of key environmental features otherwise subject to threat by adjacent development land uses.
- A comprehensive monitoring system was designed and implementation begun. The system was designed in consultation with Ontario Ministry of the Environment, University of Western Ontario, University of Guelph, Elgin Area Primary Water Board and Grand River Conservation Authority expertise.
- The Ontario Geologic Survey is conducting ongoing studies to better define the water bearing zones and to complete a regional groundwater model and water budget for the Kettle Creek watershed.
- Renewal of KCCA's environmental regulations, watershed-wide.
- Over $175,000 donated to KCCA as registered charity for environmental management and protection works.

Next Steps

- Drinking water source protection goals of the Province of Ontario overlap with environmental protection goals established for Lake Erie LaMP. Characterization of the Kettle Creek watershed, the preparation of a water resources conditions and trends report, the completion of a water budget, and finally the completion of a community based water source protection plan for the watershed will be accomplished over the next two years. Integration with federal programming for Lake Erie, in areas of mutual benefit, is required within the KCCA interface.
- KCCA's environmental monitoring system will be fully designed and implemented. Integrated with completion of all subwatershed community-based conservation strategies, and KCCA's satellite based habitat evaluation tool, an excellent basis for targeting remedial measures for best results will occur. Reporting to the public is a key element of this exercise, to ensure their continued participation.
- The development of a rejuvenated private land stewardship program will occur at the same time.

Long Point and Long Point Bay (including: Big Otter Creek, Big Creek, Lynn River, Nanticoke Creek, Sandusk Creek and Stoney Creek), Ontario

History

Long Point Region Conservation Authority (LPRCA) encompasses a regional watershed area with several third order watercourses draining directly to Lake Erie, both west and east of Long Point and Long Point Bay. Major watersheds include Big Otter in the west, Big Creek, Lynn River, Nanticoke Creek, Sandusk Creek and Stoney Creek in the east. The regional watershed area consists of approximately 2782 km^2, and includes approximately 170 km of Lake Erie shoreline (including the Long Point sand spit). The watershed is largely

dominated by two surficial geologic features, namely the Norfolk Sandplain, sweeping down from the north-east through the central and western areas of the watershed, and the Haldimand Clayplain, occupying the eastern 1/3 of the watershed, with occasional bedrock outcrops near the lakeshore and along the shoreline in the east.

The Long Point Region watershed has experienced a number of problems in recent years relating to the impairment of uses of Lake Erie. The Big Otter watershed continues to be a significant source of sediments entering the lake from the north shore, with associated nutrient loadings. Sedimentation and nutrient loadings have impaired fish habitat and wildlife habitats along the major watercourses, especially Big Creek and Lynn River. High bacteria levels in the mid-1990s have persisted on occasion in certain locations. Seasonal low water conditions (both surface water and groundwater) have been significant problems in the past several years. Pathogen problems causing mortality in waterfowl populations along the lakeshore within Long Point Bay flared up seasonally in the early 2000s, but were not of significance in 2004 or 2005.

Progress since 2004 LaMP Report

The LPRCA has had an active land and habitat restoration program in recent years, including 2004 and 2005. Approximately 400 acres of private and public land have been replanted and restored over the past three years, through a cooperative restoration project with Ontario Power Generation and the Long Point World Biosphere Reserve Foundation. Approximately 60 acres of floodplain agricultural land along Big Creek was restored on two properties acquired by the LPRCA. An additional 79-acre parcel of floodplain and wetland area was acquired in 2005, along with 85 acres of upland forest and agricultural land (that will be restored in 2006). A cooperative restoration action plan for the lower Big Creek watershed has been developed in 2005 by a number of partners, including LPRCA. LPRCA is presently working cooperatively with Kettle Creek, Catfish Creek and Grand River Conservation Authorities on water supply source protection planning, at present focusing on watershed characterization and risk assessment.

Next Steps

- The LPRCA will focus attention on the Big Otter and lower Big Creek watersheds in particular, with additional targeted properties for acquisition and/or restoration.
- "State of the watershed" reports are needed for these two watersheds in particular. Surface water and groundwater monitoring programs will need to be made a higher priority in the next couple of years.
- Private landowner extension and stewardship efforts will be a high priority in identified subwatersheds suffering erosion and sedimentation problems, utilizing new funding as available from provincial and federal programs.

Southern Grand River Ecosystem Rehabilitation Initiative, Ontario
www.grandriver.org

History

The Grand River is the largest tributary in the Canadian portion of the Lake Erie basin, draining an area of almost 7,000 km^2. Due to its size and the wide diversity of aquatic habitats it offers, the Grand River is critically important to the health of the Lake Erie ecosystem and to achieving the Lake Erie LaMP restoration goals in the eastern basin of Lake Erie. It has, therefore, been identified in the Lake Erie LaMP as a priority watershed for implementation.

Through the years, many ecological improvements have been realized in the upstream reaches of the Grand River, while water quality, habitat, and fish and wildlife populations in the lower reaches have remained impaired. The Southern Grand River Ecosystem Rehabilitation Initiative is a partnership of agencies with the common objective of restoring the aquatic ecosystem of the lower (southern) Grand River. The initiative commenced in August 2001 with a workshop entitled "Restoration of Healthy Ecosystem Function in the Lower Grand River", which provided a forum for sharing current information on the status of the southern Grand River.

A Working Group, with representation from Environment Canada, Grand River Conservation Authority, Ontario Ministry of the Environment, Ontario Ministry of Natural Resources, Six Nations First Nation, and Fisheries and Oceans Canada, was subsequently formed to coordinate research, monitoring, and implementation efforts in the southern Grand River. Projects undertaken through 2003 included: assessment of the fish community of the lower Grand River and the nearshore areas of Lake Erie, monitoring of fish passage at the Dunnville Dam fishway, initiation of a walleye radio-telemetry study to investigate habitat use and fishway passage by migrating walleye, water quality and benthic community sampling, and an examination of the Grand River plume and its influence on the nearshore areas of the eastern basin of Lake Erie.

Progress since 2004 LaMP Report

A number of projects continued in 2004 and 2005, including walleye radio-telemetry, water quality and benthic sampling, and fish passage monitoring.

A major restoration project was undertaken on Mill Creek, one of the few remaining cold water streams in the lower reaches of the Grand River. Activities included: removal of a dam and the reservoir it created; re-naturalization of the stream channel; riparian tree planting; and cattle fencing. The work has been guided by a community-developed concept for the future of the property.

Next Steps

- A State of the Southern Grand River report is currently being prepared by the Southern Grand River Ecosystem Rehabilitation Working Group. The report will summarize the current status of the southern Grand River ecosystem, identify the main issues facing the southern Grand River, and identify next steps for addressing those issues. This will be followed by the development of an Implementation Plan that will identify priorities and guide on-the-ground restoration activities, and a Research and Monitoring Plan that will identify information needs and guide research and monitoring activities to support the implementation plan and to allow for the tracking of progress.

Table 9.1: Summary of Lake Erie Remedial Action Plan and Watershed Implementation Programs

AOC / Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
AREAS OF CONCERN							
Buffalo River	Lower 6.2 miles of river	Sediments, CSOs, past industrial practices, watershed nonpoint sources	Fish consumption advisory, fish tumors, degraded benthos, dredging restrictions, loss of fish habitat	Local RAP coordinator funded (Buffalo Niagara Riverkeepers); sediment and source assessment underway; 3 habitat improvement projects constructed	Haz. waste site remediation; address NPS; improve access and shore cleanup; sediment remediation	Funding; development pressures; CSOs; contaminated sediment; public involvement	Project feasibility study and implementation; beneficial use monitoring and reporting
Presque Isle Bay	3718 acre embayment	Contaminated sediments	Fish tumors, dredging restrictions	Continued brown bullhead monitoring; initiated studies to determine reference tumor incidence rates for Lake Erie and to better understand brown bullhead populations in PIB; implemented sediment monitoring program; held workshops to address fish tumor and dredging restriction BUIs.	No further remedial actions anticipated	Developing delisting targets for tumors and contaminated sediment; standardizing tumor assessment methodology	Develop delisting targets; monitor
Ashtabula River	Lower 2 miles of river	Past industrial practices; contaminated sediments; loss of habitat	Fish consumption advisory; degraded fish populations; fish tumors; degraded benthos; dredging restrictions; loss of habitat	Comprehensive Management Plan approved; landfill location selected; NRDA underway; GLLA funding approved.	Contaminated sediment remediation: habitat restoration	Funding	Prepare final remedial plan under GLLA and WRDA; monitor for improvements; implement habitat restoration under NRDA
Cuyahoga River	Lower 45 miles of river, tributaries and 10 miles adjacent nearshore. Approximately 475 sq.miles	CSOs and bypasses; urban storm water runoff; flow alterations; navigation channel; bank erosion; point sources; hazardous waste disposal sites	Fish consumption advisory; degraded fish populations; fish tumors and other deformities; degraded benthos; dredging restrictions; eutrophication; beach closings; aesthetics; loss of habitat	Stearns Farm streambank remediation; GIS wetland inventory; over 300 wetlands surveyed for quality; dam removal upstream of AOC; adoption of LTCP for Cleveland and Akron CSOs; storm water Phase 2 plans; conservation easements; TMDL; intiated feasibility of dam removal in AOC.	Increased DO and habitat restoration in navigation channel; sediment remediation in old navigation channel; long term management of navigation channel dredgings; dam removal; implementation of storm water plans	Funding for local RAP support and implementation; creating long-term stewardship	Reassessment of sub-watersheds based on Ohio delisting targets; establishment and maintenance of sub-watershed stewardship groups; installation of fish habitat in navigation channel; implementation of LTCPs; creation of additional conservation easements

AOC / Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
Black River	Entire watershed 467 sq.mi	NPS runoff; sediment; loss of habitat	Fish consumption advisory; degraded fish populations; fish tumors and other deformities; degraded benthos; dredging restrictions; eutrophication; beach closings; aesthetics; loss of habitat; restrictions on drinking water	Redesignation of tumor BUI to "in recovery"; delisting of benthos degradation in East Branch; installation of fish shelf along lower river significantly improved habitat and the fish population; sub-watershed group established for West Branch.	Continue focus on reduction of NPS loads	Funding; public outreach and participation	Establishment of local sub-watershed groups; TMDL; additional sampling on West Branch.
Maumee River	RM 22.8 to Maumee Bay, including Duck, Otter, Cedar, Grassy, Crane, Packer, Turtle and Rusha Creeks and the Ottawa and Toussaint Rivers,636 sq.mi.	Contaminated sediments; loss of habitat; CSOs; ag and urban NPS runoff; hazardous waste sites	Fish consumption advisory; degraded fish populations; fish tumors; degraded benthos; dredging restrictions; drinking water; eutrophication; beach closings; aesthetics; loss of habitat	Toledo LTCP approved; intensive storm water and conservation education/outreach; Stage 2/watershed completed; initiated reassessment of BUIs by sub-watershed	Contaminated sediment remediation; habitat restoration; ag runoff control; wetland restoration; CSO abatement	Funding; sustained public participation; monitoring	Risk assessment for Duck/ Otter; TMDL for Swan and smaller tribs; TMDL for Toussaint; TMDL for Duck; approval of Stage 2
River Raisin	Lower 2.6 miles, 1/2 mile into lake and nearshore	Industrial and municipal discharges; contaminated sediment; water flow variability	Fish and wildlife consumption; degraded fish and wildlife; bird or animal deformities; degraded benthos; dredging restrictions; eutrophication; beach closings; degraded aesthetics; loss of habitat	240 acre Eagle Island Marsh incorporated into Detroit International Wildlife Refuge; field assessment of open waters initiated; sediment assessment of nav. channel; benthos and habitat survey	Sediment remediation; control sources of contaminants	Funding; remedial options for contaminated sediments	GLLA funding request; BUI assessment; development of fish and wildlife habitat and populations restoration targets
Rouge River	466 sq.mi. includes entire watershed	CSOs; SSOs; NPS; industrial discharges; contaminated sediment; high flow variability	Fish and wildlife consumption; degraded fish and wildlife; fish tumors; degraded benthos; dredging restrictions; eutrophication; beach closings; degraded aesthetics; loss of habitat	Legislation enacted to create Alliance of Rouge Communities; updated RAP including 20-year implementation program; monitoring showing improvement w/6 BUIs potentially eligible for removal/delisting; 77 of 83 CSOs now under control or eliminated; 32 community projects completed	Address NPS; sediment remediation; habitat restoration; manage storm water runoff.	Funding, development pressures, habitat loss	Volunteer monitoring program initiated; GIS system to map critical habitat and assist in developing fish and wildlife habitat delisting targets

AOC / Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
Detroit River (bi-national)	32 mile connecting channel with 607 sq.mi. watershed in Michigan	Habitat loss; contaminated sediments; past industrial practices; ag runoff; urban development and subsequent storm water runoff; CSOs; non-native invasive species	Fish consumption advisories and tainting; degraded fish and wildlife populations; fish tumours and deformities; bird and animal deformities and reproductive problems; degraded benthos; dredging restrictions; drinking water taste; beach closings; degraded aesthetics; loss of fish and wildlife habitat; exceedance of water quality objectives.	Improved Cdn RAP coordination; 5-year Cdn work plan developed; Cdn delisting criteria finalized; Cdn monitoring and research plan finalized; various monitoring and research programs implemented and ongoing; 220 lbs of mercury collected under Windsor household mercury program; increased Cdn public involvement and outreach; Friends of the Detroit River reconvened US PAC; GLLA funded removal of 115,600 cu.yds contaminated sediment from Black Lagoon; >900ft. of shoreline restored; numerous ag BMPs implemented; 211 acres of upland forest habitat restored.	Ongoing implementation of large-scale monitoring program; sediment remediation; habitat conservation and restoration; address urban and rural NPS; increase public investment and involvement in the cleanup	Funding; development pressures; CSOs; contaminated sediments; insufficient public involvement; transportation issues.	Aquatic habitat management plan finalization and implementation; bi-national approval of delisting criteria; implementation of monitoring and research framework; BUI update report; expansion of household mercury collection to include pharmaceuticals; increase public involvement and awareness of RAP; creation of RAP report card.
Wheatley Harbour	Wheatley Harbour and Muddy Creek wetland in Essex Region of southwestern Ontario.	PCB contaminanted sediments; nutrient enrichment and bacteria loading from ag land use and faulty septic systems; habitat loss due to development and expansion of the commercial harbour in the 1950s and 1970s respectively.	Restriction on dredging activities; restrictions on fish and wildlife consumption; loss of fish and wildlife habitat; eutrophication or undesirable algae; degradation of fish and wildlife populations.	Wetland sediment and YOY fish sampling conducted; surface soil sampling conducted at historical dredge disposal sites; wetland hydrology and sediment transport study initiated; delisting criteria revised; 40 NPS projects conducted in Muddy Creek watershed; 5 habitat restoration projects restored 6.4 hectares of habitat; held "State of Wheatley Harbour" workshop; outfall water sampling completed.	Complete PCB source trackdown; continue to implement upstream NPS projects; complete Muddy Creek hydrology and sediment transport study.	Determining if active sources of PCBs remain in the Muddy Creek wetland; engaging local community and government.	Reassessment of BUIs; development of sediment remediation strategy; development of long-term monitoring plan; meetings with general public, local industry, and local governments to present updated status and revised delisting criteria.

AOC / Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
Clinton River	760 sq.mi. includes entire watershed	Storm water runoff; NPS; CSOs; contaminated sediment	Fish and wildlife consumption; degraded fish and wildlife populations; degraded benthos; dredging restrictions; eutropication; beach closings; degraded aesthetics; loss of habitat	Grant to develop delisting targets; assessment of contaminated sediments; storm water education; 7 watershed groups developing sub-watershed management plans and Phase 2 P2	CSO and SSO control; NPS management; superfund remediation; habitat restoration; elimination of illicit connections and failing septic systems	Funding; development pressures	Refinement of delisting criteria; RAP update; WWTP upgrades; public education
St. Clair River (binational)	40 mile connecting channel from the Bluewater Bridge to Lake St. Clair and includes the St. Clair Flats from St. John's Marsh in the west, to the southern tip of Seaway Island, and east to the north shore of Mitchell's Bay on Lake St. Clair.	Chemical spills from Industry; mercury contaminated sediment; urban and ag NPS; loss of fish and widlife habitat	Restrictions on fish consumption and tainting; bird and animal deformities (based on chironomid mouthpart deformities); degradation of benthos; restrictions on dredging activities; restrictions on drinking water consumption and taste and odour problems; beach closings; degradation of aesthetics; added cost to agriculture and industry; and loss of fish and wildlife habitat	Removal of 13,370 cu.m. of mercury-contaminated sediment; replacement of fish mix offshore of Dow Chemical Canada Inc.; NPS pollution control programs and aquatic and terrestrial habitat restoration/enhancement on private and industry owned lands; progress report completed; RAP implementation committee reformed; receipt of federal grant for real-time water monitoring.	Address remaining mercury-contaminated sediment in Zones 2 and 3 and NPS pollution; identify potential for further aquatic habitat restoration projects; further assess effect of contaminants on bird and animal deformities and reproductive problems; develop chemical spill control and notification procedures; CSO and SSO control; NPS management.	Preventing industrial chemical spills to the St. Clair River and establishing suitable delisting criteria; understanding causes of beach closings and NPS pollution; restoring and protecting existing terrestrial and aquatic habitat in spite of continued urban and agricultural pressures; funding; interagency/ industry coordination.	Assessment of all BUIs and their delisting criteria with review by all agencies, the BPAC and the RAP Implementation Committee; additional contaminant monitoring and affects studies that will address degradation to benthos, fish consumption advisories and bird/ animal deformities; host facilitated workshop to comprehensively assess habitat gains and losses in the AOC, identify potential for aquatic restoration and review the delisting criteria; develop user-friendly report card.

AOC / Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
WATERSHEDS							
Kettle Creek	520 sq.km watershed in southwestern Ontario, drains south London and St. Thomas to Port Stanley on Lake Erie	Highly erodable soils and steep run-off landscape; agricultural and urban development pressures	High sediment, nutrient and bacteria loadings; ag NPS pollution; river hydrology (flash flooding, low base flow); habitat degradation	$250,000 worth of environmental rehabilitation works including tree plantings, watercourse buffers, wetland creation, streambank erosion control, environmental education, watershed cleanup days, and resource managment planning at the community and municipal level.	Monitor point and NPS pollution and habitat changes, evaluate results and target remedial work for measurable results.	Need to develop and implement monitoring, protection, and restoration activities that are required to address priorities at all three levels of government - which overlap in impacts to Lake Erie.	Complete Source Protection Planning intiatives that will identify areas of NPS pollution.
Big Otter Creek, Big Creek, Lynn River, Nanticoke Creek, Sandusk Creek and Stoney Creek	Approximately 2782 km2, and includes approximately 170 km of Lake Erie shoreline entering Lake Erie east & west of Long Point.	Erosion	High sediment, nutrient, and bacteria loadings have resulted in fish and wildlife habitat loss; pathogen problems have resulted in waterfowl mortality in Long Point Bay; seasonally low water levels.	400 acres replanted/restored; restored 60 acres of acquired floodplain agricultural land along Big Creek; acquired 79-acre parcel of floodplain/wetland + 85 acres of upland forest and agricultural land; developed a restoration action plan for lower Big Creek watershed	Source water protection planning; "state of watershed" monitoring and reporting for Big Otter and Big Creek watersheds; surface & ground water monitoring programs		Private landowner extension and stewardship efforts will be a high priority in identified subwatersheds suffering erosion and sedimentation problems, and utilizing new funding as available from provincial and federal programs.
Catfish Creek	490 sq km watershed in southwestern Ontario, draining south to Port Bruce on Lake Erie	Continued agricultural and urban development pressures resulting in nutrient and sediment loading; habitat loss; and increased flooding in the lower reaches	High sediment, nutrient and bacteria loadings; ag and urban NPS pollution; habitat loss & degradation; flooding of lower watershed	Elgin Landscape Strategy completed to help identify habitat restoration sites; over $400,000 generated for special environmental rehabilitation projects and inventories.	Local watershed studies to better target areas of concern; identify, monitor, and address point and NPS pollution and habitat changes	Land use pressures; funding for watershed strategies, monitoring and implementation measures.	Complete Source Protection Planning initatives that will identify areas of NPS pollution; work in partnership with Environment Canada and other affected government agencies to identify and implement restoration and monitoring activities needed to address land use impacts on Lake Erie.

AOC / Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
Grand River	6800 sq.km. Watershed in central SW Ontario	Urban growth and ag development pressures	Need to connect watershed issues with Lake Erie needs; impaired fish habitat;	Implementation of Grand River Fisheries Management Plan; COA assessment work on S. Grand; "Exceptional Waters" implementation; Mill Creek stewardship ranger rehabilitation; recovery team for fishes at risk; more than 1300 projects implemented under Rural Water Quality Program; removed 3 dams; Grand River and tributaries Instream/Environmental Flows Study; sub-watershed plans initiated, completed and/or implemented	Increase forest cover in the watershed from 19 to 30%; completion of source water protection plan; integrated watershed monitoring program;	Funding; addressing pressures of growth on water supply, water treatment and the environment; magnitude of rural NPS problem; coodination among federal, provincial and municipal programs for implementation	Develop integrated agency funding mechanism; implementation of GRFM, sub-watershed plans; GRSimulation model refinement; complete Grand S. Grand River assessment and initiate recommendations;
Essex Region Watersheds	425,000 acre (172,000 hectare) watershed in extreme southwestern Ontario. This peninsular region is surrounded on three sides by the Detroit River, Lake St. Clair and Lake Erie and is drained by 20 watersheds.	Land use pressures, including urban and agricultural impacts on natural lands and water quality.	Additional funding to increase NPS and habitat improvement projects; more integrated and/ or additional watershed studies to better target remedial work; require ongoing municipal engagement to address land use issues	Over 100 water quality improvement projects completed utilizing landowner incentive grants, over 200 acres of forest lands restored utilizing over 170,000 trees, over 20 community events engaging over 1,500 adults and youth, and almost 280 acres of significant natural areas protected through acquisition.	Despite ongoing progress an increased annual number of water quality improvement and habitat restoration projects are required to address local goals of 12% natural areas coverage and acceptable water quality.	Land use pressures; resources for watershed stewardship activities; imperfect integration of natural resource management activities across the region.	Aggressive pursuit of resources (funding, landowners, etc.) to restore habitat and water quality with concurrent emphasis on prevention of same in the future through landowner education and effective partnerships with muncipalities, other governments, etc.

AOC / Watershed Name	Geographic Area	Stressors	Beneficial Use Impairments/ Management Issues	Restoration Activities Completed (2004 & 2005)	Restoration Activities Needed	Challenges	Next Steps
Lake St. Clair Watershed Initiative	Canadian watershed (excluding St. Clair River) and US watershed, including St. Clair River	Land use; point and NPS source pollution; commercial & recreational boating; habitat and biodiversity loss; pathogens; spills	Degradation of fish and wildlife habitat; reduced water quality; fish consumption advisories; beach closings; chemical spills; altered hydrology; lack of defined environmental preformance measures and requisite monitoring data; stable organizational support	Lake St. Clair Coastal Habitat Assessment complete; Lake St. Clair Canadian Watershed Draft Technical Report; USACE Comprehensive Mgt. Plan for lake and river; completed consultation of proposed Cdn Management Recommendations; US TMDL for Metro & Mem. Beach begun; St. Clair Shores PCB source track down; US Lake St. Clair Regional Monitoring Project; flow modeling on the St. Clair River, Detroit River, and Lake St. Clair; third biennial Lake St. Clair Conference; Lake St. Clair Bi-national Coordinating Councils established; US Management Plan Implementation Strategy development	Detailed topographic map of lake bottom and 3D hydrological model of the Huron - Erie corridor to facilitate implementation of restoration activities; BMPs for NPS pollution; support for Lake St. Clair Coordinating Teams; development of environmental endpoints; support for implementation of USACE Management Plan	Funding; undefined measurable environmental endpoints; lack of mechanisms to ensure long-term implementation of USACE Management Plan	Complete management recommendations and develop implementation strategy; initiate US St. Clair River/Lake St. Clair drinking water monitoring project; continue Lake St. Clair Coordinating Teams' management activities
Thames River Watershed	5825 km2 watershed in southwestern Ontario, river is 273 km long, drains into Lake St. Clair	Continued land use pressures (agricultural and urban development) resulting in nutrient and sediment loads and habitat loss.	Additional funding to increase NPS projects and habitat improvement projects to address Lake Erie needs; need local watershed studies to better target remedial work.	204 rural best management projects, watershed education for 40,000 students, 120,000 trees planted for habitat improvement, local resource management plans developed or in progress, protection and rehabilitation of significant habitat.	Address NPS pollution, habitat improvement and further studies to understand source of pollution.	Land use pressures degrading watershed resources; lack of funding for watershed plans; limited monitoring and implementation.	Implementation or protection, restoration and monitoring activities need to be increased to address land use pressures and Lake Erie impacts.